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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,827	08/29/2001	Ronald A. Weimer	MTI-31532	7551

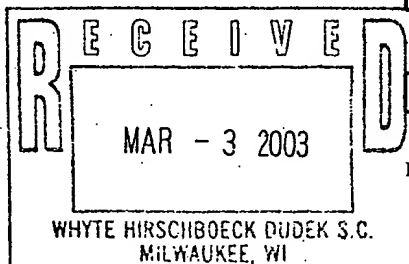
31870 7590 02/25/2003

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EXAMINER

HUYNH, YENNHU B

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/941,827

Applicant(s)

WEIMER, RONALD A.

Examiner

Yennhu B Huynh

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 03 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-62 and 78-149 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-62 and 78-149 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This Office Action is in response to the Amendment filed on 12/3/02.

#### *Election/Restrictions*

Applicant's election with traverse of Species II: claims 2-7 & 18-22 in Paper No. 9 is acknowledged.

However, Applicant states that claim 18-22 is in different species from claim 1-7 by the recited limitation of "annealing the dielectric layer in an oxidizing ambient". Therefore, the above Species II is changed and included claims 2-6 only.

Applicant also states that the claims 7-12, 23, 24, 26-31, 33042, 44, 47, 55, 62 83-110 and 111-149 are generic to claim 2.

The claims 7-12, 23, 24, 26-31, 33042, 44, 47, 55, 62 and 83-110 is in different species from claim 2 by their recited limitations are as followed:

Claims 7-12: recite the step of exposing the oxynitride layer to a nitrogen containing gas.

Claim 23: recite the steps of exposing the oxide layer to a nitrogen containing gas to form a nitrided oxide layer and forming a high K dielectric layer.

Claim 24: recite the steps of annealing the high K dielectric layer in an oxidizing ambient and where by the thickness of the nitrided oxide layer is about 40 angstroms or less.

Claims 26-31: recite the steps of forming an oxide layer over the polysilicon substrate by heating the polysilicon substrate.. , such that nitrogen concentrates within the oxide layer at an interface between the oxide layer and the polysilicon substrate, and exposing the oxide layer to a nitrogen containing gas.

Claims 33-42: recite the steps of forming a HSG, and forming tantalum pentoxide over the nitrided oxide layer..

Claim 44: recite the step of annealing a lower electrode which depended on claim 43 recites forming a capacitor container.

Claim 47: recite the step of annealing a lower electrode, which depended on claim 46 recites nitridizing the oxynitride layer in an activated gas,

Claim 55: recite the step of forming an oxynitride layer having a thickness about 40 angstroms or less, which depended on claim 44 recites of forming a capacitor.

Claim 62: recite the steps of forming an oxynitride layer having a thickness about 40 angstroms or less, which depended on claim 57 recites of forming a capacitor in a semiconductor comprising a high K inorganic metal oxide insulating material.

Claims 83-110: recite the steps of forming a high K dielectric layer over the nitridized oxide layer and exposing the dielectric layer to an oxidizing gas, the nitridized oxide layer inhibits oxidation of the polysilicon substrate....

Claims 111-149: wherein the limitation are not completely recite in claim 2 and impose a serious burden to Examiner.

Therefore, the claims 7-12, 23, 24, 26-31, 33-42, 44, 47, 55, 62 and 83-110 are different species from claim 2 and not included in claim 2.

Finally, the claim restrictions are as followed:

- c) Species III: 18-22: drawn to a method of forming a dielectric layer at less than 800 C degrees and at an oxidizing ambient.
- d) Species IV: claims 7-12, drawn to a method of forming a dielectric layer at less than 800 C degrees with plasma.
- e) Species V: claims 13-17, drawn to a method of forming a dielectric layer consists of noble metal and oxide metal.
- f) Species VI: claims 23-26, drawn to a method of forming a dielectric layer at less than 800 C degrees and having a thickness of 40 angstroms.
- g) Species VII: claims 27-31, drawn to a method of forming a dielectric layer at 900 C degrees with plasma.
- h) Species VIII: claims 32-34, 41, 42, 46 & 47, drawn to a method of forming a dielectric layer with an activated gas, HSG and thickness of 40 angstroms.
- i) Species IX: claims 35-40, drawn to a method of forming a semiconductor device above a semiconducting substrate at up to 750 C degrees, with plasma and noble metal and oxide metal.
- j) Species VIII: claims 35-40, drawn to a method of forming a semiconductor device above a semiconducting substrate at up to 750 C degrees, with dielectric as of a noble metal and oxide metal.
- k) Species IX: claims 43-45, drawn to a method of forming a dielectric layer and a lower electrode in capacitor container and annealing the electrode layer to form

an oxynitride layer, and further annealing dielectric in an oxidizing ambient (cl.45).

l) Species X: claims 48-52, drawn to a method of forming a capacitor structure without an activated gas.

m) Species XI: claims 53-62, drawn to a method of forming a capacitor structure in an activated gas (cl.53), at less than 800 C degrees (cl. 54) with noble metal and oxide metal.

n) Species XII: claims 78-82, drawn to a method of forming a dielectric layer with thermal annealing and plasma annealing (cl.82).

o) Species XIII: claims 83-88, drawn to a method of forming a dielectric layer with thermal annealing (cl.83) at less than 800 C degrees and a thickness of 40 angstroms.

p) Species XIV: claims 89-95, drawn to a method of forming a dielectric layer in capacitor container and without plasma annealing.

q) Species XV: claims 96-110, drawn to a method of forming a capacitor with more than one opening.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim

is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on 703-308-4940. The fax phone numbers

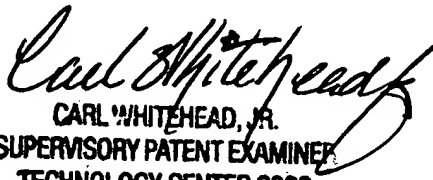
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for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7724.

YNBH,

2/23/02

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800